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FLORISTIC INVESTIGATION OF CROOKED CREEK COMMUNITY JUAN SOLOMON PARK, INDIANAPOLIS, INDIANA

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ABSTRACT: The protection of plant resources in urban areas is a growing conservation concern. Inventory activities that document species presence and stewardship plans that protect and enhance these areas are needed. The results of a botanical inventory of the Crooked Creek Community Juan Solomon Park in Indianapolis, Indiana, are reported in this paper. The 46-acre park contains three distinct habitats, supporting a wide variety of plants. One hundred seventy-nine vascular plant species from 64 families were identified, including 53 (29.6%) non-native species that are naturalizing within the park. Despite its high percentage of alien species and urban setting, the park is an important natural area. The flora's coefficient of conservatism (*sensu* Swink and Wilhelm, 1994) was 54.1. Several exotic, invasive species (most notably garlic mustard, amur bush honeysuckle, and wintercreeper) pose potential future threats to the park's natural flora, and management efforts should be focused on their removal.

KEYWORDS: Coefficient of conservatism, floristics, Indiana, invasive exotics.

INTRODUCTION

Floristic investigations that document existing plant resources provide essential information for the sound stewardship of natural areas. Management recommendations based on inventory studies can help maintain natural areas through the protection of high-quality habitats and the control of invasive, exotic species. A botanical exploration of Crooked Creek Community Juan Solomon Park (a park run by the Indianapolis Parks Department) was carried out during the flowering season of 1996. The vascular plant species in the park were identified, and voucher specimens were collected. The major plant communities and habitats were also identified. The value of the park as a natural area was assessed using Swink and Wilhelm's (1994) coefficient of conservatism. Control recommendations were developed for potentially invasive species located in the park.

Crooked Creek Community Juan Solomon Park is located at the northwest corner of Grandview Drive and Fox Hill Road along Crooked Creek in Washington Township, Marion County, Indianapolis, Indiana (Lat. 39° 51′ N, Long. 86° 11′ W; Sec. 3, T16N, R3E, Indianapolis West Quadrangle). The park consists of 46 acres. Twenty-four acres were purchased by the city in 1975, and the land provides recreational and educational opportunities for many of the local residents. An additional 22 acres were purchased by the Crooked Creek Com-

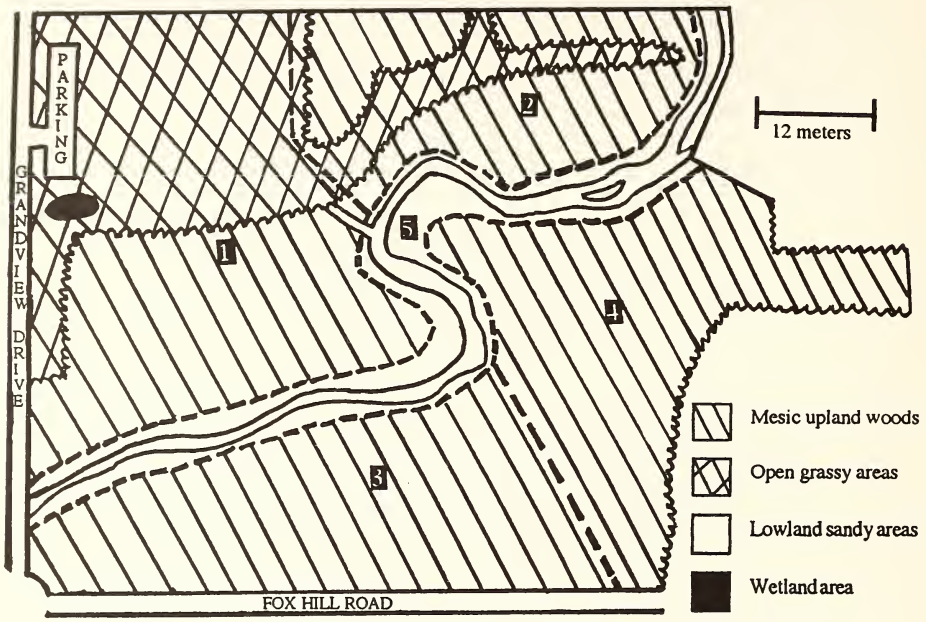

Figure 1. The major plant communities and habitats studied at the Crooked Creek Community Juan Solomon Park.

munity Council and donated to the city in September 1995. This area consists primarily of mesic upland woods. Crooked Creek, a fairly pristine creek, bisects the park into two roughly equal halves. Large sycamores and other hardwoods line the creek.

Although located in the most populous county in the State, Crooked Creek Community Juan Soloman Park is situated in a landscape of housing subdivisions and recently abandoned fields. The soils are mostly Genesee silt loams: deep, nearly level, well-drained soils formed in loamy alluvium (Sturm and Gilbert, 1978). Along the creek, small sand bars and sand spots were mapped within the soil. Indianapolis is located in the Tipton Till Plain Natural Region (*sensu* Homoya, *et al.*, 1985), a region of primarily undissected plain formerly covered by beech-maple-oak forest.

MATERIALS AND METHODS

To conduct the floristic survey, the park was divided into 5 sections according to geographical landscape (Figure 1). Each section was repeatedly visited to identify and collect as many different plants as possible. Specimens were collected over five months from April, 1996, to September, 1996, with the greatest emphasis during the months of June and July, the peak flowering season. The park was visited approximately 3 times a week during June and July and at least every two weeks during the remaining months.

Plant species were collected only if they were not considered rare, threatened, or endangered and if the sampling site had more than 20 individuals. Voucher specimens were deposited in the Friesner Herbarium (BUT) of Butler University, Indianapolis, Indiana. Photographic documentation is available for the majority of the species that could not be collected due to small sample size, inacessability of the leaves from large trees, or the adverse effects of the plant on the collector (stinging nettle or poison ivy). Plants were identified using published reference manuals. The nomenclature follows Gleason and Cronquist (1991). The Indiana Department of Natural Resource's publication (1993) on Indiana's rare plants and animals was used to identify rare, threatened, or endangered plants. In addition, management recommendations for the control and identification of invasive exotics were developed.

The coefficient of conservatism (Swink and Wilhelm, 1994) was calculated for the flora to determine the park's quality as a natural area. Swink and Wilhelm (1994) determined C values by examining the fidelity of species to high quality habitats. For this calculation, native species were assigned quality index values (C), ranging from 0 for species that are not habitat specialists to 10 for species that are indicators of high-quality plant communities.

The coefficient of conservatism (I) was calculated using the equation

$$I = \bar{C}\sqrt{N}$$

where $\bar{C}$ represents the average quality index value of all the native species present, and N is the number of native species.

Based on site surveys in the Chicago area, Swink and Wilhelm (1994) rated sites with I values of less than 35 as not significant from a natural areas perspective, sites with I values from 35 to 50 as significant, and sites with I values greater than 50 as of paramount importance for conservation. The coefficient of conservatism is not based on the abundance or frequency of the native species, because these values can vary with the seasons or between years. In addition, exotic plant species are not used in the calculation. Swink and Wilhelm (1994) believe that a low coefficient of conservatism indicates the negative impact of non-native species; only the native species present are used to determine of the quality of the flora using their scheme. However, this system was developed for the Chicago area. Although all but two native species found in this study were given quality index values by Swink and Wilhelm, the habitat fidelity characteristics of the plants may be different in the park, which is located ca. 325 km south of Chicago. Efforts have been made to develop this methodology for other geographical regions, but no system is currently available for central Indiana (Herman, 1997; Ladd, in prep.).

RESULTS AND DISCUSSION

Based on repeated visits to the five survey sections of the park, three distinct habitats were identied: mesic upland woods, lowland sandy areas, and a small wetland. Each of these areas has a unique flora. The majority of the park is mesic upland woods, characterized by large, well-spaced trees, particularly

Quercus alba, *Acer saccharum*, and *Platanus occidentalis*, with very little vegetation on the forest floor. A similar remnant Tipton Till Plain forest was reported by Rothrock, *et al.* (1994) in Mounds State Park. In locations where sunlight breaks through the trees, a burst of understory growth, often comprised of *Cystopteris fragilis* and *Impatiens capensis*, occurs. This burst of growth occurs most frequently at the edge of the woods where the greatest abundance of herbaceous plants are found. Many areas of the woods host dramatic displays of spring ephemerals, such as *Erigenia bulbosa*, *Mertensia virginica*, *Erythronium americanum*, and *Sanguinaria canadensis*.

The lowland sandy areas are located primarily along Crooked Creek, which divides the park into two nearly equal halves. The substrate in this area varies from recent sand deposits to sandy loam and supports a very different plant community than the mesic upland woods. Such species as *Justicia americana* and *Polygonum hydropiperoides* were found in this area. Many of the plants in this habitat must be adapted to life in dry sand as well as in standing water due to the great fluctuations in the level of Crooked Creek throughout the growing season.

The wetland is located in direct sunlight near the parking lot and is inhabited by *Elocharis ovata*, *Mimulus ringus*, and *Rumex crispus*. The vegetation is prominent through July. After that time, the wetland dries up almost completely and is eventually mowed. During years of high rainfall, the area may remain wet throughout the summer.

A total of 2 fern and fern allies and 177 angiosperms have been identified at Crooked Creek Community Juan Soloman Park. Of the 179 taxa found, 126 are native to the Midwest. Because 29.6% of the species were alien, the entire park cannot be a pristine natural area. However, the majority of the exotic plants were primarily if not exclusively located near the highly disturbed roadside. Away from this area, the flora is largely native with the exception of a few exotic invasives, such as garlic mustard (*Alliaria petiolata*) and wintercreeper (*Euonymus fortunei*). One plant collected, the lesser celendine (*Ranunculus ficaria* subsp. *bulbifera*), is a State record. Lesser celendine is an exotic species that has likely escaped from horticulture.

When compared to other similar sites in the State of Indiana, Crooked Creek Community Juan Soloman Park has a large number of native species per acre. Crooked Creek has an average of 2.7 native plants per acre, compared to 2.0 for the Fall Creek Nature Preserve in Warren County (Tonkovich and Sargent, 1993) and 1.5 species per acre in Mounds State Park in Madison County (Rothrock, *et al.*, 1993).

The coefficient of conservatism (Swink and Wilhelm, 1994) was 54.1, indicating that Crooked Creek Community Juan Soloman Park is a high-quality natural area in spite of the large number of non-native species present. The quality index values (C) are given in the description that follows each species' name in the checklist. Because exotic species have the potential to decrease the plant diversity (Bratton, 1982), Crooked Creek Community Juan Soloman Park needs a management plan in order to retain its quality. The invasive exotics of great-

est concern in the park are garlic mustard (*Alliaria petiolata*), wintercreeper (*Euonymus fortunei*), and amur bush honeysuckle (*Lonicera maackii*).

Garlic mustard is most effectively controlled by pulling the immature plants, including their roots, from the ground and removing all pulled plants before seed-set (Nuzzo, *et al.*, 1991). This process is most effective before the species becomes fully established in high-density populations. Fortunately, although garlic mustard is present in many areas in the park, its numbers are low at any given site.

Wintercreeper is invading many areas of the mesic upland woods in the park both in the sun and shade. Eradication efforts should include cutting each vine by hand and spraying the plant with an herbicide that is non-toxic to aquatic organisms in the event that any runoff reaches Crooked Creek. Spraying should be done in the spring before the emergence of the spring ephemerals or during late autumn when most of the native plants are dormant (Hutchison, 1991). This practice must be continued in subsequent seasons to insure that all of the wintercreeper has been eliminated and that new invading individuals are not being introduced.

Amur bush honeysuckles can tolerate many different habitat types and moisture regimes, so they are easily established and spread. The honeysuckles inhibit the growth of native species through both shading and by releasing a growth-inhibiting chemical into the ground (Nyboer, 1991). To effectively eliminate amur bush honeysuckle, the plants should be cut and the stumps treated with herbicide (Nyboer, 1991). In addition, entire seedlings, including their roots, should be removed by hand-pulling when the soil is moist (Nyboer, 1991).

Management and control of invasive exotics is crucial to the maintenance of the high quality habitats currently present in the park. Follow-up studies will be needed to determine whether the control efforts have been effective. Furthermore, the small wetland area identified in this study should be protected during any additional development activity in the park.

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LITERATURE CITED

Bratton, S.P. 1982. The effects of exotic plant and animal species on nature preserves. Natur. Areas J. 2: 3-13.

Gleason, H.A. and A. Cronquist. 1991. Manual of vascular plants of northeastern United States and adjacent Canada. New York Bot. Gard., New York, 910 pp.

Herman, K.D., L.A. Master, M.R. Penskar, A.A. Reznicek, G.S. Wilhelm, and W.W. Brodowicz. 1997. Floristic quality assessment: Development and application in the State of Michigan. Natur. Areas J. 17: 265-279.

Homoya, M.A., D.B. Abrell, J.R. Aldrich, and T.W. Post. 1985. The natural regions of Indiana. Proc. Indiana Acad. Sci. 94: 245-268.

Hutchison, M. 1990. Vegetation management guidline: Wintercreeper or climbing euonymus (*Euonymus fortunei*). Illinois Nature Preserves Comm. Vegetation Manage. Manual 1(27): 4 pp.

Indiana Department of Natural Resources. 1993. Indiana's rare plants and animals: A checklist of endangered and threatened species. Indianapolis, Indiana, 26 pp.

Ladd, D.M. in prep. The Missouri floristic quality assessment system. The Nature Conservancy, St. Louis, Missouri.

Nuzzo, V., J. Kenney, and G. Fell. 1991. Vegetation management guidline: Garlic mustard (*Allariaria petiolata* (Bieb.) Cavara & Grande). Illinois Nature Preserves Comm. Vegetation Manage. Manual 1(10): 5 pp.

Nyboer, R. 1990. Vegetation management guidline: Bush honeysuckles: Tartarian, morrow's, belle, and armur honeysuckle (*Lonicera tatarica* L., *L. morrowii* Gray, *L.* x *bella* Zabel, and *L. maackii* (Rupr.) Maxim). Illinois Nature Preserves Comm. Vegetation Manage. Manual 1(6): 4 pp.

Rothrock, P.E., H. Starcs, R. Dunbar, and R.L. Hedge. 1993. The vascular flora of Mounds State Park, Madison County, Indiana. Proc. Indiana Acad. Sci. 102: 161-199.

Swink, F. and G. Wilhelm. 1994. Plants of the Chicago region. Indiana Acad. Sci., Indianapolis, Indiana, 921 pp.

Tonkovich, G.S. and M.L. Sargent. 1993. The vascular plants of Fall Creek Gorge Nature Preserve, Warren County, Indiana. Proc. Indiana Acad. Sci. 102: 9-45.

Sturm, R.H. and R.H. Gilbert. 1978. Soil survey of Marion County, Indiana. U.S. Dep. Agr. Soil Conserv. Serv., Washington D.C., 63 pp.

CHECKLIST OF VASCULAR PLANTS IN CROOKED CREEK COMMUNITY JUAN SOLOMAN PARK ARRANGED ALPHABETICALLY BY FAMILY*

DIVISION POLYPODIOPHYTA (Fern & Fern Allies)

Aspleniaceae — Spleenwort Family

Cystopteris fragilis (L.) Bernh. var. *fragilis*
Fragile fern; frequent near the border of Section 1 towards the soccer field; C = 10; CN = 81.

DIVISION EQUISETOPHYTA

Equisetaceae — Horsetail Family

Equisetum arvense L.
Common or field horsetail; occasional in sandy soil along the creek in Section 5; C = 0; CN = 168.

DIVISION MAGNOLIOPHYTA

Acanthaceae — Acanthus Family

Justicia americana (L.) Vahl.
Water-willow; common on the sandy banks of the creek in direct sunlight; C = 6; CN = 94.

Ruellia strepens L.
Smooth ruellia; one isolated population in Section 2 under a dogwood across from the pavilion; C = 8; CN = 91.

Aceraceae — Maple Family

Acer negundo L.
Boxelder or ash-leaved maple; common throughout the park; C = 0; CN = 48.

Acer rubrum L.
Red maple; occasional throughout the mesic upland woods in all sections; C = 7; not collected.

Acer saccharum Marshall
Sugar maple; common throughout the park; C = 3; CN = 47.

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* C = The quality index of Swink and Wilhelm (1994).
CN = Raelene Crandell's collection number. The Friesner Herbarium no longer assigns accession numbers.

Anacardiaceae — Sumac Family

Toxicodendron radicans (L.) Kuntze
Poison ivy; abundant throughout the park, often as a vine; C = 2; not collected.

Annonaceae — Custard Apple Family

Asimina triloba (L.) Duna
Pawpaw; frequent in the understory throughout all sections; C= 14; CN = 76.

Apiaceae — Carrot Family

Cryptotaenia canadensis (L.) DC.
Honewort; common throughout the mesic upland woods of Sections 1-4; C = 2; CN = 64.

Daucus carota L.
Wild carrot or Queen Anne's lace; one isolated population in Section 1 near Grandview Drive; CN = 119 (alien).

Erigenia bulbosa (Michx.) Nutt.
Harbinger of spring; common in Sections 1 and 2 in both the low wetland areas and mesic upland woods; C = 10.

Osmorhiza longistylis (Torr.) DC.
Sweet cicely; common throughout the park in moist soil and near the border of the woods; C = 3; CN = 49.

Sanicula marilandica L.
Black snakeroot; common throughout the park; C = 6; CN = 73.

Araceae — Arum Family

Arisaema triphyllum (L.) Schott
Jack in the pulpit; one isolated population in Section 3 under heavy tree cover; C = 4; not collected.

Aristolochiaceae — Birthwort Family

Asarum canadense L.
Wild ginger; abundant in large clumps in the mesic upland areas of Sections 1-4; C = 7; CN = 24.

Asclepiadaceae — Milkweed Family

Apocynum cannabinum L.
Indian hemp; occasional in the mesic upland woods of Sections 1 and 2; C = 4; CN = 104.

Asclepias incarnata L.
Swamp milkweed; occasional in sand and direct sunlight near the creek in Section 5; C = 4; CN = 137.

Asclepias syriaca L.
Common milkweed; occasional at the edge of the mesic upland woods in Sections 3 and 4; C = 0; CN = 114.

Asteraceae — Aster Family

Ambrosia artemisiifolia L.
Common ragweed; abundant throughout the park in all sections; C = 0; CN = 150.

Ambrosia trifida L.
Giant ragweed; occasional among *Ambrosia artemisiifolia* L. in all sections; C = 0; CN = 149.

Aster ericoides L.
Heath aster or squarrose white aster; common at the edge of the woods in Sections 1-4; C = 5; CN = 163.

Bidens cernua L.
Nodding bur-marigold; occasional in sandy soil along the stream in Sections 1, 2, and 5; C = 5; CN = 164.

Cirsium arvense (L.) Scop.
Canada thistle; abundant along the disturbed roadside in Sections 1, 3, and 4; CN = 110 (alien).

Erigeron annuus (L.) Pers.
Daisy fleabane; common in sparsely wooded areas and near the border of the woods; C = 0; CN = 31.

Eupatorium maculatum L.
Spotted joe-pye weed; occasional along the edge of the woods in Sections 1 and 2; C = 4; CN = 144.

Eupatorium perfoliatum L.
Boneset; occasional near the creek in sandy soil; C = 4; CN = 130.

Eupatorium rugosum Houtt.
White snakeroot; frequent in direct sunlight throughout all sections of the park; C = 4; CN = 151.

Helenium autumnale L.
Sneezeweed; occasional in sandy soil near the stream in Sections 1, 2, and 5; C= 5; CN = 167.

Helianthus divaricatus L.
Woodland sunflower; common at the edge of the woods in all sections and in sand near the creek; C = 5; CN = 166.

Heliopsis helianthoides (L.) Sweet.
False sunflower; rare in sand and direct sunlight near the creek in Section 5; C = 5; CN = 124.

Lactuca canadensis L.
Tall lettuce; frequent at the edge of the woods in partial sunlight; C = 2; not collected.

Lactuca floridana var. villosa (L.) Gaertner
Woodland or blue lettuce; abundant along the edge of the woods in partial sunlight; C = 5; CN = 134.

Lactuca serriola L.
Prickly lettuce; isolated population located along the disturbed roadside in Section 1; CN = 111 (alien).

Polymnia canadensis L.
Pale-flowered leaf-cup; abundant at the edge of the woods throughout all sections; C = 10; CN = 146.

Rudbeckia fulgida Ait.
Eastern coneflower; frequent at the edge of the woods in partial sunlight; C = 8; CN = 135.

Senecio jacobaea L.
Tansy-ragwort; rare, one plant in Section 2 at the edge of the woods; not collected (alien).

Silphium perfoliatum L.
Cup-plant; one population in Section 5 in sand and direct sunlight near the creek; C = 5; CN = 139.

Solidago canadensis L.
Common goldenrod; occasional throughout the park and near the creek in sunny areas; C = 1; CN = 164.

Sonchus oleraceus L.
Common sow-thistle; common along the roadside in Sections 3 and 4; CN = 131(alien).

Taraxacum officinale Weber *ex* Wiggers
Common dandelion; common in direct sunlight and open areas among grass; CN = 35 (alien).

Verbesina alternifolia (L.) Britton
Wingstem; common throughout the park in sunny areas; C = 5; CN = 147.

Balsaminiaceae — Jewel-Weed Family

Impatiens capensis Meerb.
Spotted touch-me-not; abundant in mesic upland areas among stinging nettle; C = 3; CN = 71.

Impatiens pallida Nutt.
Pale or yellow touch-me-not; occasional in mesic upland areas, not as abundant as *Impatiens capensis* Meerb.; C = 6; CN = 83.

Berberidaceae — Barberry Family

Podophyllum peltatum L.
May apple; frequent throughout all mesic upland areas, often occurring in large clumps; C = 4; CN = 21.

Betulaceae — Birch Family

Ostrya virginiana (Miller) K. Koch.
Hop-hornbeam or ironwood; occasional throughout the mesic upland woods of all sections; C = 5; not collected.

Boraginaceae — Borage Family

Mertensia virginica (L.) Pers.
Eastern bluebell; rare, in sandy soil near the creek in Section 2; C = 5; CN = 11.

Brassicaceae — Mustard Family

Alliaria petiolata (Bieb.) Cavara & Grande
Garlic-mustard; exotic invasive, abundant throughout all sections; CN = 19 (alien).

Barbarea vulgaris R. Br.
Yellow rocket; occasional in direct sunlight in Sections 1 and 2 among the mowed grass; CN = 97 (alien).

Cardamine concatenata (Michx.) O. Schwarz
Five-parted toothwort; common in the mesic upland areas of Sections 1-4 where the trees are sparse; C = 5; CN = 3.

Cardamine douglassi Britton
Purple cress; isolated population in the open wetland area of Section 1 near the parking lot; C = 7; CN = 70.

Hesperis matronalis L.
Dame's rocket; common throughout the mesic upland woods of Sections 1-4, particularily at the edges; CN = 30 (alien).

Lepidium virginicum L.
Poor-man's-pepper or pepper-grass; rare, one small, isolated population in the mesic upland woods of Section 1; CN = 86 (alien).

Caesalpiniaceae — Caesalpinia Family

Cercis canadensis L.
Redbud; occasional in mesic upland areas; C = 10; CN = 72.

Gleditsia triacanthos L.
Honey-locust; occasional throughout the park in all sections; C = 2; not collected.

Gymnocladus dioica (L.) K. Koch.
Kentucky coffee-tree; occasional in mesic upland areas; C = 8; not collected.

Campanulaceae — Bellflower Family

Campanula americana L.
American bellflower; one population in a small clearing in sandy soil; C = 3; CN = 126.

Lobelia siphilitica L.
Great lobelia; occasional in sand near the creek in Sections 1 and 2; C = 6; CN = 158.

Caprifoliaceae — Honeysuckle Family

Lonicera japonica Thunb.
Japanese honeysuckle; isolated population in Section 2 climbing on some trees and shrubs; CN = 77 (alien).

Lonicera maackii (Rupr.) Maxim.
Amur bush honeysuckle; common in Sections 1-4 along the edge of the woods; CN = 60 (alien).

Lonicera oblongifolia (Goldie) Hook
Swamp fly honeysuckle; occasional in mesic upland areas; C = 10; CN = 28.

Caryophyllaceae — Pink Family

Saponaria officinalis L.
Bouncing bet; one isolated population in sand and direct sunlight near the creek in Section 5; CN = 121 (alien).

Silene nivea (Nutt.) Otth.
White campion; common in sandy soil near the creek; C = 10; CN = 90.

Stellaria media (L.) Villars.
Common chickweed; common along the border of the woods in Sections 1 and 2; CN = 33 (alien).

Celastraceae — Bittersweet Family

Celastrus scandens L.
American bittersweet; occasional throughout the mesic upland woods of all sections; C = 4; not collected.

Euonymus atropurpureus Jacqs.
Wahoo; one shrub at the border of the woods in Section 2 that may have been planted for horticultural reasons; C = 8; CN = 78.

Euonymus fortunei (Turcz.) Hand.-Mazz.
Wintercreeper; exotic invasive throughout mesic upland woods of Sections 1-4; CN = 105 (alien).

Chenopodiaceae — Goosefoot Family

Chenopodium album L.
Lamb's quarters or pigweed; occasional along the disturbed roadside in Sections 3 and 4; CN = 132 (alien).

Clusiaceae — Mangosteen Family

Hypericum mutilum L.
Dwarf St. John's-wort; occasional near the creek in sandy soil and partial sunlight in Section 5; C = 8; CN = 118.

Commelinaceae — Spiderwort Family

Commelina communis L.
Common day-flower; occasional in sand near the creek in Section 5; CN = 136 (alien).

Tradescantia virginiana L.
Spiderwort; occasional in the mesic upland woods of Sections 1-4; C = 5; CN = 102.

Convolvulaceae — Morning-glory Family

Calystegia sepium (L.) R.Br.
Hedge-bindweed; locally abundant in Section 5 along the creek in sand and direct sunlight; C = 1; CN = 113.

Cornaceae — Dogwood Family

Cornus drummondii C.A. Meyer
Rough-leaved dogwood; occasional in Sections 1 and 2, most often near the border of the woods; C = 2; CN = 75.

Cucurbitaceae — Gourd Family

Sicyos angulatus L.
Bur-cucumber; occasional in Sections 1 and 2 climbing on small shrubs; C = 5; CN = 157.

Cyperaceae — Sedge Family

Carex amphibola Steudel
Sedge; common throughout the mesic upland woods of Sections 1-4; C = 10; CN = 58.

Carex davisii Schwein & Torr.
Sedge; occasional in sandy soil under heavy tree cover in Sections 1, 2, and 5; C = 7; CN = 87.

Carex grayi Carey
Sedge; occasional in moist, sandy soil; C = 7; CN = 127.

Carex shortiana Dewey
Sedge; one isolated population in sandy soil on the trail through Section 1; C = 10; CN = 89.

Elocharis ovata (Roth) Roemer & Schultes
Blunt spike-rush; locally abundant in the open wetland in Section 1 near the parking lot; C = 10; CN = 66.

Dipsacaceae — Teasel Family

Dipsacus sylvestris Huds.
Common teasel; abundant along the disturbed roadside in Sections 1, 3, and 4; CN = 112 (alien).

Fabaceae — Pea Family

Melilotus officinalis (L.) Pallas
Yellow sweet clover; one isolated population in Section 4 near Fox Hill Road; CN = 99 (alien).

Robinia pseudoacacia L.
Black locust; common throughout the mesic upland woods; CN = 42.

Trifolium dubium Sibth.
Little hop-clover; frequent in direct sunlight in the open grassy areas of Sections 1 and 2; CN = 37 (alien).

Trifolium repens L.
White clover; abundant in direct sunlight in the open grassy areas of Sections 1 and 2; CN = 36 (alien).

Fagaceae — Beech Family

Fagus grandifolia Ehrh.
American beech; frequent throughout the park; C = 5; CN = 122.

Quercus alba L.
White oak; occasional throughout the mesic upland woods of all sections; C = 5; not collected.

Quercus muhlenbergii Engelm.
Yellow oak; common in the mesic upland woods of Sections 1-4; C = 8; CN = 84.

Quercus palustris Muenchh.
Pin-oak; occasional throughout the mesic upland woods of all sections; C = 8; not collected; likely planted.

Quercus rubra L.
Red oak; the edge of the woods near the pavilion; not as common as the other oaks; C = 7; CN = 84.

Quercus velutina Lam.
Black oak; occasional throughout the mesic upland woods of all sections; C = 6; not collected.

Fumariaceae — Fumitory Family

Dicentra cucullaria (L.) Bernh.
Dutchman's breeches; frequent throughout the mesic upland woods of Sections 1-4; C = 6; CN = 2.

Grossulariaceae — Gooseberry Family

Hydrangea paniculata Siebold
Hydrangea; occasional in Section 5 in sandy soil and partial sunlight; CN = 129 (alien).

Hydrophylaceae — Waterleaf Family

Hydrophyllum appendiculatum Michx.
Biennial waterleaf; occasional in sandy soil and throughout the mesic upland woods of Sections 1-4; C = 8; CN = 26.

Iridaceae — Iris Family

Sisyrinchium angustifolium Miller
Blue-eyed grass; one isolated population in Section 1 at the edge of the woods near Grandview Drive; C = 10; CN = 34.

Juglandaceae — Walnut Family

Carya cordiformis (Wangenh.) K. Koch.
Bitternut hickory; occasional throughout the mesic upland woods of all sections; C = 7; not collected.

Carya ovata (Miller) K. Koch.
Shagbark hickory; occasional in the mesic upland woods; C = 5; not collected.

Lamiaceae — Mint Family

Glechoma hederacea L.
Gill-over-the-ground; abundant throughout all sections; CN = 8 (alien).

Lamium amplexicaule L.
Henbit; common in direct sunlight and at the edge of the woods in Sections 1 and 2; CN = 14 (alien).

Leonurus cardiaca L.
Motherwort; common near the edge of the woods near Fox Hill Road in Sections 3 and 4; CN = 101 (alien).

Mentha arvensis L.
Field mint; occasional in sandy soil near the creek; C = 5; CN = 138.

Prunella vulgaris L.
Self-heal; occasional at the edge of the woods in Sections 1 and 2; CN = 98 (alien).

Stachys tenuifolia Willd.
Smooth hedge-nettle; occasional to frequent at the edge of the woods in Sections 1 and 2; C = 8; CN = 148.

Teucrium canadense L.
Germander; occasional in Section 1 at the edge of the woods; C = 3; CN = 120.

Liliaceae — Lily Family

Allium tricoccum Aiton
Ramps, wild leek; one small isolated population under heavy tree cover along the trail through Section 1; C = 7; CN = 93.

Allium vineale L.
Field-garlic; common throughout the park in partial to direct sunlight, especially near its borders; CN = 59 (alien).

Camassia scilloides (Raf.) Cory
Wild hyacinth; occasional in sandy soil in Sections 1 and 2; C = 6; CN = 10.

Erythronium americanum Ker-Gawl.
Yellow trout lily; common in the heavily shaded areas of the mesic upland woods of Sections 1-4; C = 8; CN = 5.

Hemerocallis fulva (L.) L.
Day-lily; common along the disturbed roadside in Sections 3 and 4 near Fox Hill Road; CN = 103 (alien).

Narcissus pseudo-narcissus L.
Daffodil; two isolated plants in sandy soil near the creek; not collected (alien).

Ornithogalum umbellatum L.
Star of Bethlehem; rare, two isolated populations in Sections 1 and 3; not collected (alien).

Polygonatum biflorum (Walter) Elliott
Soloman's seal; abundant in sandy soil and throughout the mesic upland woods of all sections; C = 3; CN = 32.

Trillium recurvatum Beck
Red trillium; common in the heavily shaded areas of the mesic upland woods of Sections 1-4; C = 5; CN = 18.

Moraceae — Mulberry Family

Morus alba L.
White mulberry; frequent throughout all sections; CN = 51 (alien).

Oleaceae — Olive Family

Fraxinus americana L.
White ash; common throughout the mesic upland woods of Sections 1-4; C = 5; CN = 50.

Fraxinus pennsylvanica Marshall
Green ash; occasional along the creek in Section 5 and rare throughout the mesic upland woods of Sections 1-4; C = 5; not collected.

Onagraceae — Evening Primrose Family

Circaea lutetiana L.
Enchanter's nightshade; abundant in Sections 1 and 2; C = 1; CN = 82.

Oenothera biennis L.
Common evening-primrose; rare along the disturbed roadside in Sections 1 and 3; C = 0; not collected.

Oxalidaceae — Wood Sorrel Family

Oxalis grandis Small
Yellow wood-sorrel; abundant in direct sunlight in the open grassy areas of Sections 1 and 2; CN = 38 (alien).

Papaveraceae — Poppy Family

Sanguinaria canadensis L.
Bloodroot; common throughout the mesic upland woods of Sections 1-4; C = 6; CN = 1.

Stylophorum diphyllum (Michx.) Nutt.
Celandine-poppy; one isolated population in Section 2 across from the playground in a sparsely wooded area; C = 10; CN = 27.

Phytolaccaceae — Pokeweed Family

Phytolacca americana L.
Pokeweed; two isolated populations in Sections 1 and 4; C = 1; CN = 115.

Plantaginaceae — Plantain Family

Plantago lanceolata L.
English plantain; common near the disturbed roadside in Sections 3 and 4; CN = 85, 160 (alien).

Plantago major L.
Common plantain; common in the open areas of Sections 1 and 2 among the mowed grass; CN = 106 (alien).

Platanaceae — Plane-Tree Family

Platanus occidentalis L.
Sycamore; common throughout all sections; C = 6; not collected.

Poaceae — Grass Family

Dactylis glomerata L.
Orchard grass; common throughout all sections; CN = 57 (alien).

Eleusine indica (L.) Gaertn.
Yard grass; common throughout the park in the open, disturbed areas of all sections; CN = 140 (alien).

Elymus riparius Wieg.
Streambank wild rye; common throughout the mesic upland woods of Sections 1-4; C = 5; CN = 107.

Elymus villosus Muhl.
Downy wild rye; common in sandy soil in Sections 1, 2, and 5; C = 5; CN = 65 (alien).

Elytrigia repens (L.) Nevski.
Quack-grass; common in the open areas of Sections 1 and 2; CN = 62 (alien).

Festuca rubra L.
Red fescue; frequent throughout all sections of the park; CN = 56 (alien).

Phalaris arundinacea L.
Reed canary grass; frequent at the edge of the creek in sandy soil in Sections 1, 2, and 5; CN = 88 (alien).

Phleum pratense L.
Timothy; common throughout the mesic upland woods of Sections 1-4; CN = 108 (alien).

Poa pratensis L.
Kentucky bluegrass; frequent throughout all sections of the park; CN = 61 (alien).

Setaria glauca (L.) P. Beauv.
Yellow foxtail grass; frequent near the edge of Fox Hill Road and in other disturbed areas in Sections 1, 3, and 4; CN = 159, 161(alien).

Polemoniaceae — Phlox Family

Phlox divaricata L.
Common phlox; occasional in sandy soil in Sections 1 and 2; C = 5; CN = 13.

Phlox paniculata L.
Summer phlox; occasional in sandy soil along the creek; CN = 143.

Polygonaceae — Buckwheat Family

Polygonum amphibium L.
Water smartweed; occasional in sand near the creek in Sections 1, 2, and 5 among *Polygonum lapathifolium* L.; C = 4; CN = 154.

Polygonum hydropiperoides Michx.
False water-pepper; occasional in moist sand and often standing water near the creek in Section 5; C = 7; CN = 128.

Polygonum lapathifolium L.
Pale smartweed; occasional in sand near creek in Sections 1, 2, and 5; C = 0; CN = 155.

Polygonum pensylvanicum L.
Smartweed; common in disturbed areas near the roadside and near the border of the woods in Sections 1-4; C = 0; CN = 68.

Polygonum persicaria L.
Lady's thumb; common along Fox Hill Road in Sections 3 and 4; CN = 141 (alien).

Polygonum scandens L.
False buckwheat; occasional in all sections of the park climbing on small shrubs; C = 1; CN = 152.

Polygonum virginianum L.
Virginia knotweed or jumpseed; occasional throughout the park in partial sunlight; C = 2; CN = 156.

Rumex crispus L.
Curly dock; common in the open wetland in Section 1 and in the mesic upland woods of Sections 1-4; CN = 67 (alien).

Pontederiaceae — Water-Hyacinth Family

Pontederia cordata L.
Pickerel-weed; one plant found in the creek along the edge of the trail in Section 1; C = 10; not collected.

Portulaceae — Purslane Family

Claytonia virginica L.
Spring-beauty; frequent in direct sunlight and at the edge of the woods in Sections 1-4; C = 2; CN = 4.

Portulaca oleracea L.
Common purslane; common growing out of the cracks in the asphalt near the edge of the parking lot in Section 1; CN = 142 (alien).

Primulaceae — Primrose Family

Lysimachia ciliata L.
Fringed loosestrife; common in Sections 1 and 2 in partial to direct sunlight; C = 4; CN = 79.

Ranunculaceae — Buttercup Family

Anemonella thalictroides (L.) Spach.
Rue anemone; common throughout Sections 1 and 2; C = 7; CN = 17.

Ranunculus abortivus L.
Small-flowered crowfoot; common in sandy soil and the mesic upland woods of Sections 1-4; C = 0; CN = 20.

Ranunculus ficaria L. subsp. *bulbifera* Lambionon
Lesser celandine; one isolated population in sandy soil in Section 2; CN = 7 (alien).

Rosaceae — Rose Family

Agrimonia gryposepala Wallr.
Common agrimony; occasional at the edge of the woods in partial sunlight in Section 2; C = 2; CN = 145.

Crataegus sp. L.
Hawthorn; common in the mesic upland woods; C = 4; not collected.

Geum canadense Jacq.
White avens; only a couple dozen plants along the edge of the woods in Sections 1 and 2; C = 1; CN = 80.

Prunus serotina Ehrh.
Wild black cherry; common throughout the mesic upland woods of Sections 1-5; C = 1; CN = 43.

Rosa carolina L.
Pasture rose; one isolated population in Section 4 near Fox Hill Road.; C = 5; CN = 100.

Rosa multiflora Thunb.
Multiflora rose; one shrub in Section 2 at the edge of the woods that may have been planted for horticultural reasons; CN = 39 (alien).

Rubus allegheniensis T.C. Porter
Common blackberry; one shrub in Section 2 at the edge of the woods that may have been planted for horticultural reasons; C = 3; CN = 40.

Rubiaceae — Madder Family

Gallium aparine L.
Cleavers; abundant in all mesic upland areas where myrtle is not abundant; C = 1; CN = 23.

Salicaceae — Willow Family

Populus deltoides Marshall
Common cottonwood; occasional in the mesic upland areas; C = 2; CN = 52.

Salix babylonica L.
Weeping willow; one tree in Section 3 near the bridge on Grandview Drive; C = 53 (alien).

Salix nigra Marshall
Black willow; occasional throughout the mesic upland woods of Sections 3 and 4; C = 4; not collected.

Scrophulariaceae — Figwort Family

Mimulus ringens L.
Monkey-flower; common in direct sunlight in Section 1 among the mowed grass and in the wetland; C = 6; CN = 96.

Verbascum thapsus L.
Common mullein; occasional along the roadside in Sections 3 and 4; CN = 123 (alien).

Veronica arvensis L.
Corn speedwell; common in Sections 1 and 2 in direct sunlight among the grass; often occurs with *Lamium amplexicaule* L.; CN = 15 (alien).

Veronica peregrina L.
Purslane speedwell; common in Sections 1 and 2 in direct sunlight among the grass; C = 0; CN = 29.

Simaroubaceae — Quassia Family

Ailanthus altissima (Miller) Swingle
Tree of heaven; only one isolated population in Section 1, but common in Sections 3-4; CN = 95 (alien).

Solanaceae — Nightshade Family

Solanum carolinense L.
Horse-nettle; occasional to rare in Sections 1 and 4 near the edge of the woods; CN = 109 (alien).

Solanum dulcamara L.
Bittersweet; common in Sections 1-3 in partial to direct sunlight; CN = 54 (alien).

Tiliaceae — Linden Family

Tilia americana L.
Basswood or American linden; occasional throughout the park; C = 5; not collected.

Ulmaceae — Elm Family

Celtis occidentalis L.
Northern hackberry; common throughout the park; C = 3; not collected.

Ulmus rubra Muhl.
Red or slippery elm; common throughout the mesic upland woods of Sections 1-5; C = 4; CN = 46.

Urticaceae — Nettle Family

Pilea pumila (L.) Gray
Clearweed; common along the edge of the woods in direct sunlight in Sections 1 and 2; C = 5; CN = 153.

Urtica dioica L.
Stinging nettle; abundant in the mesic upland woods and throughout all sections, especially among jewelweed; not collected (alien).

Verbenaceae — Vervain Family

Phryma leptostachya L.
Lopseed; common at the border of the mesic upland woods in Sections 1 and 2; C = 4; CN = 92.

Verbena urticifolia L.
White vervain; occasional at the border of the mesic upland woods in Sections 1 and 2; C = 5; CN = 116.

Violaceae — Violet Family

Viola cucullata Aiton.
Blue marsh-violet; abundant throughout all sections; C = 9; CN = 6.

Viola pubescens Aiton.
Yellow forest violet; common throughout Sections 1-4; C = 5; CN = 16.

Viola striata Aiton.
Cream or pale violet; abundant throughout Sections 1-4; C = 6; CN = 12.

Vitaceae — Grape Family

Parthenocissus quinquefolia (L.) Planchon
Virginia-creeper; abundant in all sections; C = 2; CN = 49.

Vitis vulpina L.
Winter grape; abundant in all sections and common climbing on small shrubs; C = 9; CN = 125.